

- III. "On the Male, and the Structure, of *Thaumops pellucida*." By R. VON WILLEMOES-SUHM, Ph.D., H.M.S. 'Challenger.' Communicated by Prof. HUXLEY, Sec. R.S. Received October 24, 1873.

(Abstract.)

This is an addition to the paper on *Thaumops pellucida* by the same author (Proceedings of the Royal Society, vol. xxi. p. 206), containing an account of the male, and some corrections of the description formerly given. The species appears to be widely distributed, and to live at moderate depths, coming to the surface at night.

- IV. "On the Bending of the Ribs in Forced Breathing." By ARTHUR RANSOME, M.D. Communicated by Dr. BURDON SANDERSON, M.D., F.R.S. Received May 15, 1873.

(Abstract.)

In a paper "On the Mechanical Conditions of the Respiratory Movements," read before the Royal Society in November 1872*, the author endeavoured to show that there is a distinct difference in the chord lengths of a sternal rib in the two positions of full inspiration and forced expiration, and that a certain degree of bending of the ribs usually takes place in forced breathing. The measurements on which these conclusions were based were made with a 3-plane stethometer, the performance of which was not sufficiently accurate to satisfy the author, who has accordingly repeated them by the aid of a new instrument, the construction and use of which are described at length in the present communication. The author considers that the new instrument gives fairly accurate results, which fully corroborate the conclusions previously enunciated.

December 18, 1873.

JOSEPH DALTON HOOKER, C.B., President, in the Chair.

Pursuant to notice given at the last Meeting, the President proposed, and Professor Henry John Stephen Smith seconded, the Right Hon. Edward Cardwell, M.P., Secretary of State for War, for election and immediate ballot.

The ballot having been taken, Mr. Cardwell was declared duly elected.

The Presents received were laid on the Table, and thanks ordered for them.

* Proceedings of the Royal Society, November 22, 1872.

The following communications were read :—

- I. "On the Period of Hemispherical Excess of Sun-spots, and the 26-day Period of Terrestrial Magnetism." By J. A. BROUN, F.R.S. Received September 13, 1873.

It appears from the interesting communication to the Royal Society, June 19th, by Messrs. De La Rue, Stewart, and Loewy*, that the difference of the area of spots on the visible northern and southern quarter-spheres of the sun seems, during periods of considerable solar disturbance, to obey a law such that the difference is a maximum in the same quarter-sphere during several successive rotations of the sun, the difference being a maximum alternately in the northern and southern hemispheres—the time from maximum to maximum, for the same hemisphere, being variable between 18 and 32 days, but having a mean value of about 25·2 days.

It occurs at once that if the variations of the mean terrestrial magnetic force are connected in any way with the solar spots, or the causes which produce them, we might here find some explanation of the magnetic period of 26 days, the difference of spot-area in one hemisphere from that in the other being related to a difference of the solar magnetic action.

In order to determine whether such a connexion existed, I projected first the curves of excess of spot-area given in the paper of Messrs. De La Rue, Stewart, and Loewy, and below them the daily mean horizontal force of the earth's magnetism during the same periods. The conclusion from these projections is, that there is *no relation whatever between the two classes of curves.* The maxima and minima of the one agree in no way with those of the other: the greatest excesses of sun-spot area in the one hemisphere over those in the other occur when the earth's magnetic force is the most constant; the greatest variations of the earth's magnetic force from the mean occur in several instances when the sun-spot area is equal in the two visible quarter-spheres.

It should be remembered, in considering the curves of sun-spot excess, that the minima and maxima are in some cases only relative,—sometimes the one, sometimes the other being really cases in which there is neither maximum nor minimum—that is to say, cases in which the sun-spot area is equal, or nearly so, in the two visible quarter-spheres.

It would be hasty to conclude from this comparison that the variations of the mean magnetic force are really unconnected with the mode of distribution of the sun-spots. Other methods of grouping the spots may perhaps be employed with advantage relatively to this and other questions; for example, were the position of the centre of gravity of the sun-spots determined for the visible quarter-spheres and hemisphere,

* Proc. Roy. Soc. vol. xxi. p. 399.

giving each spot a weight in proportion to its area, the variation of these positions in latitude and longitude, and their weights, might give a more satisfactory base for this comparison and for other deductions.

It will be obvious also that this investigation refers only to the *visible* hemisphere of the sun; an approximation to the spot-distribution on the other hemisphere, however, will be frequently possible.

II. "On the Nervous System of *Actinia*."—Part I. By Professor P. MARTIN DUNCAN, M.B. Lond., F.R.S., &c. Received October 9, 1873.

(Abstract.)

After noticing the investigations of previous anatomists in the histology of the chromatophores, the work of Schneider and Rötteken on these supposed organs of special sense is examined and criticised.

Agreeing with Rötteken in his description, some further information is given respecting the nature of the bacillary layer and the minute anatomy of the elongated cells called "cones" by that author. The position and nature of the pigment-cells is pointed out, and also the peculiarities of the tissues they environ. It is shown that the large refractile cells, which, according to Rötteken, are situated between the bacilli and the cones, are not invariably in that position, but that bacilli, cones, and cells are often found separate. They are parts of the ectothelium, and when conjoined enable light to affect the nervous system more readily than when they are separate. Further information is given respecting the fusiform nerve-cells and small fibres noticed by Rötteken in the tissue beneath the cones; and the discovery of united ganglion-like cells and a diffused plexiform arrangement of nerve is asserted. The probability of a continuous plexus round the *Actinia* and beneath each chromatophore is suggested, and the physiological action of the structures in relation to light is explained.

The minute structure of the muscular fibres and their attached fibrous tissue in the base of *Actinia* is noticed; and the nervous system in that region is asserted to consist of a plexus beneath the endothelium, in which are fusiform cells and fibres like sympathetic nerve-fibrils. Moreover, between the muscular layers there is a continuation of this plexus, whose ultimate fibrils pass obliquely over the muscular fibres, and either dip between or are lost on them.

The other parts of the *Actinia* are under the examination of the author, but their details are not sufficiently advanced for publication. The nervous system, so far as it is examined, consists of isolated fusiform cells with small ends (Rötteken), and of fusiform and spherical cells which communicate with each other and with a diffused plexus. The plexus at the base is areolar; and its ultimate fibres are swollen here and there, the whole being of a pale grey colour.